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The Proper Use of Public Parks.

LARGE open spaces of public land within the limits of compactly built cities offer a constant temptation to persons who feel that they hold a joint ownership with their fellow-citizens in such property; who feel, too, that a portion of this property is needed for some purpose in which they are specially interested, and which appears to them of vital importance. Urban parks will never be free from the danger of assaults upon their integrity, and of perversion to purposes destructive of their highest usefulness, so long as any considerable body of citizens remains uninstructed as to the fundamental reasons which justify their existence and control their design. It would be hardly just to charge with utter selfishness the owners of trotting horses who desire to cut a speed-road through Central Park. They know that such a track would minister to their chosen recreation, and they fail to comprehend that it would defeat the chief end of the park, which is to furnish another and a nobler recreation for everybody else. The same can be said of those who have endeavored to convert the Meadows of Central Park into a military parade-ground, and of almost all other persons who have been eager at one time or another to condemn the park, or some portion of it, to illegitimate use. The storm of indignant protest which was aroused by the first suggestion that Central Park should be selected as the site for the Exposition of 1892 seemed a hopeful sign that public sentiment was becoming more enlightened in this direction; but, unfortunately, lamentable proof has since been given that there are still men of intelligence and public spirit who are willing to see the park turned into desolation for years and probably forever for the sake of a temporary show. It is a discouraging fact that so small a fraction of the population of the city really comprehend the special function in our civic economy which the park is designed to fulfil, and understand that when, for the advantage, real or assumed, of any class or sect, or cause or interest, it is diverted to some use which interferes with its legitimate office, the entire community suffers a wrong.

The fact that every man in a city has a right to its park, as a park, implies, that no one has a right to it as anything else than a park. This view is not held by certain labor organizations in Boston who insist on using Franklin Park as a place for holding mass meetings, and who resent the refusal of the authorities to surrender the park for this purpose as an abridgment of the right of public assemblage. Of course, this last charge would have no foundation even if a piece of public ground, admirably situated for the purpose, had not been offered, as it was offered, to the labor organizations for their proposed meeting. The pity of it is that these men fail to discern that they have an especial interest in saving the park from any intrusion that even remotely threatens to impair its efficiency, or limit its capacity, of furnishing recreation for themselves and their children. Franklin Park was designed to offer the most practical and natural and perfect relief from the confinement and pressure and wear that are inevitable where men and women are crowded together under the strain of city life. As a direct antithesis to all this, the park furnishes the freedom of spacious meadows and open skies, the contact with pure nature, the tranquilizing influence of pastoral scenery, and invitations on every hand to rest or play. The millionaires of Boston have less need of the recreation offered, for they can spend the entire summer in their villas, on the mountains, or by the sea. But it is for those who have no country seats, and who take no vacations, and for their children, that this delightful picture of rural peace stands ready to furnish rest and healing, both to the mind and body. The men who are striving to reduce the hours of labor are precisely the ones who should avail themselves of these privileges during their hours of recreation. Of course a meeting or a demonstration in favor of some movement is utterly out of harmony with the spirit of the place. It would bring into the park the very conditions from which the park was designed to offer a relief and an escape—the jostling throng, the commotion, the stress and heat of excited discussion. It is plain that such assemblages are incompatible with restfulness and peace. Their avowed purpose is agitation, and this means essential antagonism to the purpose of the park.

It follows without argument, that if the representatives of one movement or cause are allowed to use the park for meetings, other bodies are entitled to a like privilege, and the play-ground will become the chosen spot where reformers of all sorts can indulge in a vociferous advocacy of their pet projects. A body of worthy clergymen who form the Evangelical Alliance are even now seconding a demand to permit preaching in the park, and this would encounter, besides the objections already mentioned, the special ones which arise from the sensitiveness of many persons and classes in matters of religion. To permit the use of the park for purposes that would be offensive to any considerable number of those who resort there would be a manifest injustice. Wandering sectarian preachers are none too gentle, as a rule, when they are characterizing other creeds than their own, and they can easily succeed in making themselves disagreeable. A large proportion of the working people who most need the park are Catholics, and why should they, for example, be forced to hear their faith attacked in their own pleasure-grounds? And if one sect is allowed to preach, the same privilege must be granted to all others. The spectacle of a dozen sects conducting services at the same time might give pleasure to the hoodlum element, but it would hardly minister to the enjoyment of those who were seeking the reposeful influences of rural scenery.

But urban parks, as we have said, will never be secure against destructive invasion so long as such dense ignorance prevails as to their appropriate purpose. Casual remarks of several wealthy and accomplished gentlemen of the committee to select a site for the world's fair in this city prove that they have not the slightest feeling for the beauty of natural scenery, nor the slightest appreciation of its value in a city park. They propose to obliterate what is altogether the most valuable and lovely portion of Central Park and speak of the part they hope to confiscate as "waste ground," and talk of "improving" it by

cutting down the trees, and making a desert of its stretches of greensward. The future of the city parks in this country is by no means secure—nor will it be, until the people generally understand that these parks have a function to fulfil which is quite as distinct as that of churches and schools and libraries, and until it comes to be a general and unquestioned belief that these pleasure-grounds are absolutely indispensable to the well-being of those who are subjected to the complex conditions of modern city life.

Drives and Walks.—III.

IN a preceding chapter we discussed the laying-out of a road on a place where the lawn is large enough to be crossed by it. When is this the case? Only when the lawn is so extensive that the drive will not be conspicuous from the house, or, at all events, from the principal side—when a wide space in front of the house can be left undisturbed by its intrusive, artificial line. That is to say, a drive should really never cross a lawn, although it may divide one lawn from another that can be treated as an almost independent picture. As a feature in a picture a road or walk is always to be deplored; but as a frame which encircles a picture it may be made inoffensive, and sometimes, with its bordering plantations, actually advantageous. Too wide and open a prospect is not desirable any more than one too cramped and crowded; while plantations are often needed to justify the course of the road, they are also needed to adorn it to the eyes of those who pass over it. Trees and shrubs may explain its curvatures, and it may explain the presence of shadowing foliage and attractive lower masses of green. Each helps the other by giving it a reason for existence, and both together may be beautifully brought into the middle distance at the side of a landscape picture, framing the foreground and affording glimpses, more attractive than a wholly unobstructed view, into the landscape beyond.

To preserve a wide expanse of lawn in front of a house is in itself sufficient excuse for carrying the road to one side. If a minor curve is justified by the wish to preserve a fine tree, so a general deflection from the direct line of approach is justified by the wish to secure that broad stretch of green which is the most beautiful of all possible adjuncts to a house, which is the indispensable foreground in any natural picture where utter wildness of aspect is not desired. A carefully clipped and tended lawn is the first thing to be secured where there is any comparatively level ground; where the house is anything but the simplest cottage, and where the rest of the place is to be "kept up" by the gardener's hand. If place and purse are so modest that the expense of turfing and clipping cannot be incurred, then a stretch of meadow left in its natural condition is essential; and in either case it is equally necessary that, to produce the right effect of breadth and peacefulness, the grass should be kept as free as possible from roads and walks.

To secure a good lawn where it can be most enjoyed—to keep the approach from cutting into two parts what ought to be an harmonious picture opposite the chief windows—it is best not to have the entrance front of the house and the lawn front the same. Even though the highway may lie opposite the front where the lawn must be made, the approach ought, if possible, to be carried to a door which lies in another side. There will be no look of caprice in such an arrangement, for where the front door is, there, of necessity, the road must go. It will not suffice to carry the road to one side, leaving an agreeable expanse of lawn, and then bring it along close by the house to a door in the lawn-front. This is a very common arrangement but a very bad one. If a road crossing the lawn in full sight of the chief windows and piazzas is offensive, still more so is a road running between the house and and the lawn, forming a barren streak in the immediate foreground of the picture, and preventing that union of the house-foundations with the grass which it is so important to secure. Worse than anything else, however, is the wide sweep we constantly see, where, between house and lawn, a road returns upon itself. No one would ruin a fine painted landscape by pasting a strip or great circle of gray paper over the lower part of the foreground; yet this is just what hundreds of owners do with strips and circles of gray gravel in their natural landscapes. And how much pleasanter is it for the foot to step from door or window or piazza directly to the grass than to be obliged to cross a stretch of dusty or muddy road!

In these last paragraphs we find another reason why, as was said in a former paper, the house should not be planned or placed until the roadways have been mapped out. A want of consideration in placing the main entrance may easily ruin the chance, not only for a good approach, but for a good lawn as well. Neither architect nor owner can always tell where it will be best to make the lawn any more than where it will be best to run the roads. The front-door is the end of the approach, and not to consult the landscape-gardener with regard to its position is to strike, without his consent, the key-note which must govern his whole arrangement.

What has been said with regard to the length of roads applies also to their width—the less there is of them in either direction the better. A drive where vehicles meet should be wide enough to allow them to pass without danger to themselves or the borders, but anything in excess of this should be studiously avoided; and if a turning-place must be provided near the house, the oval should be made as narrow as convenience will allow, or the road should be carried around a plantation of some sort. Here again, however, the plantation should not be a flower-bed. It should not look as though it had been put in to fill up a sweep which had been made too large; it should not look as though it existed because of the road. The road should look as though it took the encircling curve because there was an obstacle to its turning short upon itself which it was desirable to preserve. And the exact character of this obstacle should be regulated by surrounding things, and especially by those which lie opposite the door. If it is well to shut out something unattractive, then a shrubbery or low-growing tree may fill the space; or, if it is well that the eye should have free passage, then a tree with higher branches may be chosen.

A Cypress Avenue at Verona.

THE avenue of Cypress trees shown in our illustration, on page 464, forms the most conspicuous feature of the garden of the Villa Giusti, in the city of Verona. The villa itself, a Renaissance building, is not of great architectural importance, nor are the gardens very extensive, covering, perhaps, an acre and a half of ground. But they are beautifully laid out in the true Italian style, and there is nothing in all Italy finer in its way than this Cypress avenue. The trees are probably some four hundred years old, and most of them are in fine condition, although one of those shown in the picture died a few years ago. At the end of the avenue is a series of marble terraces, each affording a more beautiful view than the last of the lovely, ancient city with its wide river, Roman amphitheatres and soaring mediæval towers. Beyond the balustraded top, as we see, still other Cypresses are planted. In Goethe's "Italian Journey" he speaks with enthusiasm of the situation of the Giusti gardens and of their unrivalled Cypresses, and fancies that the pyramidally-clipped Yews of northern Europe may have been imitations of such admirable natural forms. Yet the Romans had clipped the Cypress itself to form "verdant walls" in their gardens, and cut it into the most fantastic shapes—representing, for instance, fleets of ships and hunters following their prey.

The genus *Cupressus* includes a number of species which are natives of southern Europe, Asia, Mexico and California; and the vernacular name "Cypress" is also given to other coniferous trees which are not true Cypresses, the most familiar example being *Taxodium distichum*, the deciduous or Bald Cypress of our southern states. The tree shown in our illustration is the best known of all the true Cypresses. It is the one constantly referred to by ancient authors and constantly used in modern poetical imagery—the symbol of grief, gloom and death, as the Oak is of strength, the Laurel of triumph, and the Myrtle of festivity. It is *Cupressus sempervirens*, peculiar for its fastigiate or pyramidal shape. Its branches grow in an upright direction close to the stem, giving the tree a tapering, pointed outline, which is even more conspicuous among trees of ordinary habit than the shape of the Lombardy Poplar. The branchlets, growing in frond-like forms, are set thick and close together, and covered with very small, smooth, shining, scale-like leaves of a dark yet yellowish-green. These are evergreen, remaining on the tree for five or six years. The cones are oval, about two inches in length, and borne singly on short stalks. The usual height of the Cypress in its native homes—Greece and the islands of the Archipelago, Turkey and Asia Minor—is fifty or sixty feet, although it sometimes grows to a height of 100 feet. It is hardy in the southern counties of England, yet flourishes in Algerian gardens. Nor is it particular as to situation, growing sometimes in moist river-bottoms and sometimes on dry rocky precipices. Its best development occurs, however, "in soils which are deep and sandy,

rather dry than moist, somewhat sheltered, and at no great elevation above the sea."*

The Bible tells us that the Cypress grew in the Holy Land, and associates it with the Cedar in dignity—"I am exalted like the Cedar of Lebanon and like a Cypress on Mount Sion." The Egyptians knew it well, the Assyrians also, and the Greeks and Romans. It is now found in an apparently wild state in Italy; but Pliny assures us that it was not native to his country but had been introduced from Greece and first planted near Tarentum.

The Cypress, like the Lotus, was an emblem of immortality in all ancient times. But the interpretation put upon this common significance of the two plants seems to have varied as widely as their aspect. As a symbol of life after death, the Lotus was held sacred to Osiris, the god of generation, but as a symbol of the same thing the Cypress was consecrated to the dead and held sacred to Pluto and Proserpine. Ideas of joy and hope were associated with the Lotus, ideas of sorrow and bereavement with the Cypress. The reason of the difference is not hard to find. The Lotus is beautiful, graceful and gay in aspect, the Cypress is solemn and dignified and never seems more appropriately placed than when, like the Yew of England, it stands in a place of tombs. It was chosen as an emblem of immortality because it was an evergreen, and also because it would immediately rise again to an upright position if bent down by the wind or by manual force. Its association with ideas of death was explained by the fact that, if cut down, it throws up no suckers from the root. But such significations were always explained among the ancients by some poetic legend, and with reference to the mournful meanings of the Cypress, Ovid tells us that a youth named Cyparissus, a favorite of Apollo, having shot, by accident, a pet stag, grieved so deeply that he prayed he might visibly mourn forever. He was thereupon transformed into a Cypress-tree, and Apollo,

> "Sadly sighing, cried:
> 'Be then forever what thy wish implied,
> Be moaned by me, in others grief excite,
> And still preside at every funeral rite.'"

All Oriental nations still plant Cypresses in their burial-grounds, and the Turks place one at either end of a grave. They are so numerous, writes Loudon, "at Scutari that the cemetery there resembles one vast forest of Cypress. This magnificent burying-ground extends for miles in length; and among high and turbaned tombstones, gold-lettered inscriptions, and graves ornamented with flowers, the tall evergreen Cypress has a very striking effect." As we remember this cemetery, however, it is anything but magnificent in effect. It is, indeed, of vast extent, and some of the tombs, when examined, are very beautifully carved. But they are crowded so close together that it seems as though one body must often encroach upon the resting-place of the next; hundreds of the tall stones are out of the perpendicular, giving a painful look of neglect and decay, and the Cypresses, too, are pressed so close together that the dignity of their forms is less conspicuous than the deep and mournful gloom caused by the density of their shade. The Cypress is not a tree to plant thus in groves. It looks its best when seen in isolated examples or when arranged in avenues, like the one portrayed in our picture. But its dark and spiry outlines, rising everywhere from the court-yards of the houses, give great individuality and beauty to the general aspect of oriental towns. Constantinople, as seen from the harbor, covering its hills with its masses of white walls and its domes and minarets, would be far less beautiful were the general whiteness not relieved by innumerable lofty Cypress-trees, now standing singly and now forming little clumps or long lines, high above the house-roofs.

In mediæval Persia the Cypress was especially honored. Its pyramidal outline was thought to resemble a flame, and it was, therefore, planted near the temples of the fire-worshippers. A legend, which Firdusi versified, tells that the first Cypress came direct to Zoroaster from Paradise, and was planted by him in front of the temple at Kischmer, in Khorasan. When it was cut down by the Mohammedan caliph, Motewekkil, it was believed to be 1,450 years old. In India the Cypress is one of the most conspicuous of cultivated trees, standing, as usual, near tombs, or forming avenues similar to the one at Verona. In China, too, we read* that ancient grave-yards are laid out in squares and contain "tablets innumerable, Cypress-trees, gates, walls and bridges." The tomb of Confucius lies north of the city of Kio-fou-hien, "at a distance of about a mile; a fine avenue of old Cypress trees leads direct from the north gate to the burial-ground;" the grave itself lies in a "forest of Oak, Cypress and other kinds of trees, enclosed by a high wall;" and everywhere in the neighborhood is "the unfailing Cypress." The grounds of the chief temple in the city itself are likewise filled with Cypresses, and one of them is said to have been planted by Confucius himself. "Its gnarled and aged trunk bears evidence of its great age;" but if it was, indeed, planted by the sage, it must be no less than 2,540 years old!

One of the most remarkable Cypresses in the world stands—or still stood not long ago—at Soma, or Somma, in Lombardy. According to some accounts it was planted in the year when Christ was born, but others declare that it was a tree in the time of Julius Cæsar. It is 121 feet in height, and twenty-three feet in circumference at one foot above the ground. Francis I., of France, drove his sword into this tree in his rage at having been defeated at the battle of Pavia; and Napoleon respected it sufficiently to deflect the line of one of his great highroads rather than do it harm. Near Shirâz, in Persia, stands a Cypress which is said to have been planted by the poet Hafiz or to have sprung up on his grave. At Chartreux are some famous Cypresses which were planted by Michael Angelo. The trunk of the largest, when measured in 1817, girthed about thirteen feet. Many writers have celebrated *Los Cypressos de la Reyna Sultana*, which form an avenue in the palace-gardens of the Generalife at Granada, and are connected with the history of the massacre of the Abencerages by the last Moorish king of that province. They are supposed to have been large trees at that time—1490—and were still flourishing in 1832. It would be interesting to know what is now their condition.

Modern folk-lore tells us that the Cypress brings ill-luck, especially when it comes to us in dreams. The wood of the Cypress is very durable, and in many different ages has been used for coffins. Thucydides says that Greeks who died for their country had their ashes preserved in Cypress-chests. Pliny refers to a statue of Jupiter in the Capitol, at Rome, which was made of Cypress-wood, had existed for 600 years, and was still in perfect condition, He adds that the doors of the temple of Delphi, likewise of this wood, had the appearance of being quite new when they had hung for 400 years. In his own time the wood was much used for rustic purposes, and, as plantations of Cypress could be cut every thirteen years for poles, vine-props, etc., they were esteemed so valuable that they were given as marriage portions, and hence the tree itself was sometimes called *dos filiae*. Plato had his code of laws engraved on Cypress-wood, and, in the fifteenth century, A.D., Leon Alberti found the wood of an ancient ship which had been submerged for 1,300 years, as he declared, to be chiefly of Cypress and still perfectly sound. The doors of old St. Peter's, in Rome, were of Cypress, and in admirable condition after they had lasted 1,100 years. Mediæval popes were often buried in Cypress coffins.

The balsamic odor of Cypress-wood and of the growing tree is constantly referred to by ancient writers, and it is said that oriental physicians used to send consumptive patients to the Island of Crete, where the Cypress grew in great abundance, on account of the healing qualities of the air, as in modern times they are sent where Pine forests abound.

* Loudon: "Arboretum."
* Loomis: "Confucius and the Chinese Classics."

Notes Upon Some North American Trees.—XI.

CARYA.—The first author to separate the Hickories from the Walnuts and to place them in a genus by themselves was Rafinesque. His first attempt was made in 1808, in the *Medical Repository* (v., 352), in which in a single paragraph he simply enumerated after the word *Scoria* the specific names, in parenthesis, of five Hickories. It has been suggested (Britton in *Bull. Torrey Bot.* Club, xv., 275) that *Scoria* was simply a misprint for *Hicoria*. This may well have been, but it is not important, as no characters having been indicated by Rafinesque at this time for his proposed new genus, or any reasons assigned for separating the Hickories and Walnuts, *Scoria* or *Hicoria* of the date 1808 cannot be considered. Rafinesque, however, in the "Flora Ludoviciana," published in 1817, clearly defined, on page 109, the characters which separate the Hickories from the Walnuts, under his account of *Hicorius amara*, and it is evident that he was the first to propose in print a separate genus for these trees, the *Carya* of Nuttall not having been published until a year later (1818); and it is just and correct therefore to discard the now familiar *Carya* of Nuttall and

take up the equally appropriate *Hicorius* of Rafinesque, for there can hardly be a question that the name should be written as Rafinesque wrote it when he defined the characters of his genus, and that an earlier generic name without characters cannot be considered. I propose, therefore, to follow in the main, with the substitution of *Hicorius* for *Hicoria*, the nomenclature which has been carefully elaborated for this genus by Dr. Britton (*l. c.*), although the rejection of *Hicoria* will add another to the heavy load of synonyms with which these trees are encumbered.

241. CARYA OLIVÆFORMIS, Nutt., will become *Hicorius Pecan*, Marshall's specific name (Arbustum Americanum published in 1785), Pecan being the first published and four years older than Wangenheim's (Amer. 54, t. 18. f. 43) *Juglans Illinoinensis*.

242. CARYA ALBA, Nutt., becomes *Hicorius ovatus*. The different species of Hickory were not distinguished by Linnæus, but his herbarium shows that the tree which it has become the habit to call *Carya tomentosa* was really what he meant by his *Juglans alba*, and that the oldest post-Linnæan specific name for the Shell-bark is that of Miller (Dictionary ed. 8. 1768) *Juglans ovata*.

Carya microcarpa of Nuttall was considered in the Census Catalogue a synonym of *C. alba*. This was probably a mistake, but there still exist doubts about the true position of this tree to be cleared up. Dr. Britton (*l. c.*) would retain the Nuttallian species and places his *Hicoria microcarpa* in a section with the Pig-nut. His specimens gathered on Staten Island, where this tree is not rare, seem to me to belong to a not uncommon form of the Pig-nut with small compressed globular nuts, which were familiar to the younger Michaux (Silva, i, 196, t. 38) and to Emerson (Trees and Shrubs of Massachussetts 198). But it is not quite clear that it was this small round nut that Nuttall had in mind when he wrote the characters of his *Carya microcarpa*. He described the nut as "partly quadrangular;" and in the figure in his Silva, the exocarp is represented as thick, while the nut although small is strongly four-angled like a Mocker-nut, as his description, "nuce subglobosa subquadrangulata", implies, as does the following sentence, "by the leaves it appears to be allied to *C. glabra*, but the nut on a small scale, is that of *C. tomentosa*, or the common Hickory." Some further investigation of the Pig-nut group of our Hickories made in the field, especially in the neighborhood of Philadelphia where Nuttall found his tree, is desirable, and necessary to clear up the doubtful points of their specific limitations. It was this small fruited Hickory that Marshall described as *Juglans alba odorata* in the "Arbustum Americanum" as Nuttall has pointed out in the Silva. So that if it is found that the species must be kept up, the name for it would appear to be *Hicorius odoratus*.

243. CARYA SULCATA, Nutt., becomes *Hicorius sulcatus*.

244. CARYA TOMENTOSA, Nutt., becomes *Hicorius albus*.

245. CARYA PORCINA, Nutt., becomes *Hicorius glaber*, this species having been first described as *Juglans glabra*.

246. CARYA AMARA, Nutt., becomes *Hicorius minimus*., this species having been distinguished first by Marshall (Arbustum Americanum) as *Juglans alba minima*.

247. CARYA MYRISTICÆFORMIS, Nutt., becomes *Hicorius myristicæformis*.

The Nutmeg Hickory was discovered west of the Mississippi River much earlier than has been generally supposed. A specimen preserved in the Torrey Herbarium of Columbia College shows that Fremont on his third expedition found it at Camp 24, "near the Creek," on the 3d of July, 1845. The known range of this species was greatly extended last year by Mr. Pringle, who found a few trees in one of the cañons of the Sierra Madre in the vicinity of Monterey, Mexico.

248. CARYA AQUATICA, Nutt., becomes *Hicorius aquaticus*.

C. S. Sargent.

The Shell-bark Hickory.

THE Hickory is purely an American tree. The eight species which are known all belong to the southern half of the North American continent, with the headquarters of the genus, as represented by the greatest number of species in any one locality, in the valley of the Red River, in Arkansas, with one species pushing far south along the Mexican Sierra Madre. No other country or region of the earth can boast of an indigenous Hickory-tree, although it is quite within the bounds of possibility that one, and perhaps several species may still be found in the unexplored mountain districts of central China, so similar are the floras of our eastern states and of eastern Asia in actual composition, and so closely related in their descent from remote common ancestors. The Hickories, at least some of the species, are among the most valuable trees in the world. There has never been a boy or girl brought up in any part of the country east of the Missouri River who has not early learned the value of the pecan, or the hickory-nut, or the mocker-nut; and the wood which some of these trees yield has no equal, and certainly no superior, for certain purposes. There is no wood at once so tough and strong and true. It is the Hickory-wood in its handle which has carried the American axe round the world, driving, wherever it is known, all other axes out of the market; and it has made possible those light carriages, which in turn have made possible the American trotting horse, one of the marvels of these modern times, and probably the best example of what can be accomplished, by careful breeding and persistent selection, in the development of domestic animals for a special purpose. No other tree is known whose wood is tough enough and strong enough to stand the strain imposed upon the American trotting-sulky, and without the modern sulky and its heavier forerunner, neither breeding nor training could have produced that race of horses which every American looks upon in his heart of hearts with joy and admiration. As a nation we owe much to the Hickory-tree, and we have good and just reason for being proud of it. It is a tree known to many people; next to the Oak and the Pine, more Americans know the Hickory-tree when they see it than any other of our trees. That is, they know, generally, the Hickory, without distinguishing the different species, which is hardly surprising, since botanists themselves are often perplexed over questions concerning the proper limitations of these species. Nor are these questions ever likely to be settled quite satisfactorily, for it is probable that several of the species are inclined to hybridize one with another and so produce those individuals of doubtful characters which are the despair of people who expect to be able to fit exactly every plant they encounter with the printed description of it in some book.

The Shell-bark Hickory is considered, generally, the most valuable of the genus. The nuts, of course, are not esteemed as highly as pecans, and they are, prehaps, rather inferior to and considerably smaller than those of a western representative of the genus, (*Hickorius sulcatus*), the wood of which is equal to that of the Shell-bark. Still, the Shell-bark, perhaps, is the tree which people have in mind, generally, when they think or speak of a Hickory-tree; and the peculiarity of the bark which separates into great thick, loose scales, gives to this tree a distinctive appearance which makes it easily known and recognized.

The Shell-bark, as it is now seen in the eastern States, is generally an obconical, square-topped tree, with rather small branches, produced low down on the trunk. Such trees have grown generally since the land was first cleared for settlement and agriculture, and there are not now many people living here at the east who, unless they know the forests of the Mississippi Valley, and more especially those found on the higher Alleghany Mountains, have an idea of what a large Hickory-tree is, growing as it grew naturally before the white man disturbed and changed the natural condition of this country. Our illustration of a fine tree in

southern Indiana will give an idea, at least, of the dimensions to which this tree can attain under favorable conditions; and brings out admirably the peculiar character of the distinctive bark, to which habit is due the popular and familiar name of the species. The Shell-barks in this particular region, Mr. Ridgway notes (*Proc. U. S. Nat. Mus.*, 1882, 77), are sometimes 150 feet high, with trunks four or five feet in diameter. and bare of limbs for seventy or eighty feet; and even larger trees can be found in the western and still almost untouched forests of eastern Tennessee and western North Carolina. But these large trees are doomed, and before many more years have passed every Hickory-tree of sufficient size and proper quality will have been sacrificed to supply the ever-increasing demands which the industries of men make on this tree. The area of the region in which the Hickory grows to perfection is really small in comparison with the demand for it; and when no substitute can be found for a particular wood it must in time be exterminated however abundant the natural supply, unless measures are taken to increase and perpetuate it artificially. And it would appear that of all our trees the Hickory is the one which should be planted wherever suitable land can be spared for it; and it should be protected and cherished, in view of the ever-increasing demands the world is making and must continue to make on this tree.

Entomological.

A New Enemy of the Elm.

(*Gossyparia Ulmi.*)

IN the last (August) number of *Insect Life*, Mr. L. O. Howard has an interesting paper, accompanied by some excellent figures, on this new Elm-pest, belonging to the Coccid or "scale insect" tribe. The article is entitled "A Newly-imported Elm Insect," and it gives a good summary of what is known of the life history of the insect which is considered as having been introduced from Europe on European Elms, and which has been found in several places in New York State and also about Boston and in Washington. Near Boston it was first noticed in the Arnold Arboretum, in the summer of 1887. Since then it has increased very much, and has been found quite abundantly in many places in the vicinity of the city. Although first found on the Slippery Elm (*Ulmus fulva*), it has latterly been more frequently observed on the American Elm (*U. Americana*) than on any other species. It also attacks *U. racemosa* as well as the European species, *U. campestris* and *U. montana*.

The accompanying illustration from a photograph will be of assistance in recognizing the pest, and will give an idea of its appearance at one stage of its existence. The photograph was taken about June 20th, which is the season when the coccids may be most readily detected, and it represents fully grown females on the bark of a young Slippery Elm. The round of their existence may be described as follows:

These females are viviparous, and, in this vicinity, reproduction begins about June 20th. All the females do not mature at the same time, so that the young continue to come forth for a couple of weeks. The young larva is elongated, oval in shape, and of a clear yellow color, and, under the microscope, a number of spines on the back and sides may be seen, as well as the six-jointed antennæ. As soon as they escape from the parent body the young begin moving actively about upon the trunk and branches, and sometimes collect in great numbers on the under side of the latter. Most of them soon find their way to the leaves, where they fix themselves and become quiescent, feeding upon the juices for four or five weeks, or, in some cases, for a much longer time. On some trees, which have no pubescence or bristles on the young shoots or twigs, many of the insects settle about the crevices of the buds, etc. On the leaves they are often found on both the upper and lower surfaces, either in the crevices made by, or close along the sides and angles of, the midrib and principal veins. On *Ulmus Americana* and *U. racemosa* they are found most abundantly upon the under surface, and in other species they occur on the upper or lower surface according to the amount of pubescence which prevails. They are less numerous where it is densely bristly. Late in July and during August they cast their skins, assume a permanent reddish or brownish color, and become active once more. The main color is often much obscured by a fine and easily-removed gray or white waxy powder, which is secreted by, and carried upon, the many spines with which the back is covered. Nearly all of them return to the branches and trunk, where they settle themselves in crevices of the bark. Here they remain during the autumn and winter. If the days are warm in late April and early May they begin to move again, and soon afterwards changes of skin take place and small white cocoons are made, or, as Mr. Howard says, "the females cast their last skin and the males form their cocoons."

They issue forth within a week or ten days. Two forms of males have been noticed; the first, about two millimeters (say .08 of an inch) in length, has rudimentary or unexpanded wings, but appears to be perfectly developed in other respects, and the other, which comes forth a few days later, has broad, perfectly developed wings, and also differs from the imperfect male in having a more slender body and two long, slender, white filaments projecting from the anal segment. Soon after this the females fix themselves for the last time to the bark of the trunk or branches and continue to suck the sap of the tree and increase considerably in size, especially in diameter.

Fig. 129.—Gossyparia Ulmi.—Full-grown females.

A white waxy substance is secreted, which afterward becomes so abundant as to form a sort of cushion beneath and around the sides of the insects, giving them the conspicuous appearance seen in the illustration. Here they remain, and in the latter part of June the living young begin to swarm forth; the mother insect gradually becomes smaller, shrivels and dies, and, after a time, the waxy cushion becomes dull and wears away, although traces of it may remain for many months.

During all the feeding period of their existence the coccids throw out a sort of "honey dew," in very minute drops, which, falling upon the trunk, branches and lower leaves of the tree causes them to become blackened, and many ants, wasps, flies and other insects are attracted to the sweet food. When dry this may be scraped from the leaves in sooty-like flakes.

Trees that are much infested with these insects make their presence known at a distance of several rods by a peculiar sweet, somewhat pungent, though not unpleasant, odor. An odor much like it may be noticed when drying green leaves of *Ulmus fulva*. On old trees the insects cannot get nourishment through the thick, corky bark of the trunks, and so ascend to the higher parts and branches, where they are not easily discovered. In some cases they may be a cause of the unhealthy appearance of trees. When abundant, they greatly injure the vitality of young trees if they do not destroy them.

No systematic experiments with insecticides have as yet been tried, but an application in June of whale-oil soap and kerosene, made pretty strong and applied with a stiff brush, appeared to kill all that were thoroughly washed, but some on the small branches escaped, so that enough were left to thickly colonize the tree again within a year or two. Thoroughly spraying the trees with kerosene emulsion, at a season when the insects are active and tender, might lead to more satisfactory results, but the chances are that some would escape.

It has been noticed that a few of the insects sometimes remain on the leaves until they fall in the autumn, and in this way they could be carried from one tree to another. When active they may easily be carried to widely-separated localities upon the feet of birds.

Arnold Arboretum. *J. G. Jack.*

Foreign Correspondence.

London Letter.

AT last we have bright sunshine and summer warmth again, and, in consequence, autumn flowers of all kinds have come out amazingly during the past week or so. Owing to this the last August exhibition at the Royal Horticultural Society's meeting was exceptionally large and interesting. It was remarkable, also, for the large number of novelties submitted, and no fewer than two dozen certificates were awarded. The chief feature of the meeting was a magnificent collection of Gandavensis Gladioli from the celebrated nurseries at Langport, which is undoubtedly the headquarters in Europe for these splendid flowers. There were about two hundred spikes shown, representing all the colors through which the Gladiolus ranges, and every spike was massive and set with large flowers of faultless shape. In some instances I measured spikes fully eighteen inches long, with only two or three unexpanded buds. But, unhappily, Messrs. Kelway's splendid success is not a reflex of Gladiolus-culture throughout the country. Failure in fact is more common than success, and no one can deny that the highly-bred Gladioli of the Gandavensis race are delicate in constitution, requiring exceptional treatment and favorable conditions of soil and climate. Though I have seen them grown in private gardens as fine as the Langport specimens, the prevalent complaint is that they are disappointing. But a new era in the culture of this flower is at hand, and in a few years success will be more frequent, and this will be brought about by the intermixture of hardier blood with these delicate strains. M. Lemoine's recent triumphs with the Purpureo-auratus race have convinced Messrs. Kelway at last of the importance of these new hybrids, for they have begun to raise them at Langport, and at this exhibition they showed us one fine example, at least, of their work. This variety is one called Leonard Kelway, in which we see the characteristic features of Gandavensis, the large spike and open flower combined with the growth and habit of *G. purpureo-auratus*. It is of wonderfully rich color, some of the petals being a deep maroon-crimson, others rose-pink brightening to scarlet. Now that Messrs. Kelway have made a fair start, we hope to see next season numerous new hybrids of the same stamp, which will be most welcome. They showed a large number of new sorts of the ordinary Gandavensis type, but as they reached perfection with these years ago, one cannot appreciate the difference between the old and the new; now and then there is a distinct "break" in color, but neither of the two certificated were exceptional in this respect. They were called Duke of Fife, a brilliant crimson, flaked with white, and Vulso, a pale salmon-pink with white centre. In both, the flowers were quite up to the florist's standard, and the spike was long and massive.

Turning from the Gladioli to the Dahlias we find novelties in every section, but in most cases it is a difficult matter to intelligently describe how they differ from old sorts, especially in the large, double, show kinds. There was a large collection of these from the famous raisers, Keynes & Co., of Salisbury, and four were selected as worthy of awards of merit. These were Crimson Globe, brilliant crimson—almost scarlet; Reliance, yellow-buff, flaked and tipped with crimson; John Hickling, a warm yellow, and Alice Emily, orange-yellow marked with carnation-red. All these were, of course, the acme of size and form. Among the Cactus section, which seems to be now more popular than any other, there were some very beautiful new sorts, and one named Panthea, a large spreading flower of a vivid flame color, won an award. The others that pleased me much were Asia, a delicate blush-pink; Empress of India, maroon-crimson; Lady Marsham, cherry-crimson; H. Patrick, the best white Cactus; Honoria, the best yellow; Mrs. Hawkins, yellow, flushed with pink, and Amphion, buff and reddish-brown. The only single sort certificated was named F. L. Temple, in compliment to an American nurseryman now travelling in England. His namesake is like the old Paragon, the best of the earliest sorts, but larger, and the deep maroon and crimson edges seem brighter. It was shown by Mr. Ware, of Tottenham.

Among other certificated plants were three good Orchids, two of which were varieties of the popular *Lælia elegans* which flowers at this season. One variety was from the Duke of Marlborough, at Blenheim, and was named The Duchess. It is very distinct from the ordinary form, and beautiful, the sepals and petals being rosy-purple, and the broad, middle lobe of the labellum rich crimson, fading to almost white, while the lateral lobes are quite white. Another form called Cook's variety is at once recognized by the smaller flowers, their symmetrical shape, and the brilliant crimson hue of the labellum. These two were the best of a number of varieties of this Lœlia exhibited, which exemplified clearly what a wide range of variation exists in the cultivated forms of this beautitul Orchid. The other certificated Orchid was the old *Angræcum Chailluanum*, discovered thirty years ago by the great African explorer Du Chaillu. It is still rare, and by certificating it the committee stamp it as a good Orchid. It is small in growth, and produces a long spike of greenish-white flowers with long narrow sepals and attenuated spurs. Messrs Veitch showed, for the first time, a new species of Phajus from the Philippines, which has been named at Kew *P. Philippensis*. It is interesting, but not a striking beauty, the flowers being small and poor in color. Some fine examples of Satyrium (Terrestrial Orchids from South Africa) attracted notice, as they are so seldom seen in a flourishing, much less flowering, state. *S. carneum* has a dense spike of pink flowers, and *S. aurantiacum* has flowers of a rich orange-yellow.

A beautiful old half-hardy bulb from the Cape, known as *Watsonia rosea*, was certificated because of its value as a garden plant. It has Gladiolus-like growth, and a tall and slender spike, thickly set with open flowers of a clear rose-pink color. Mr. Ware exhibited it in splendid condition, showing what a fine plant it is when well grown. Mr. B. S. Williams was awarded a certificate for a new species of Carludovica belonging to the Cyclanthaceæ, and allied to the Palms, which they resemble. This new species is *C. palmæfolia*, and is of graceful growth, with tall recurving fan-like leaves. It will make a first rate decorative plant. A new Sarracenia, named *S. decora*, was shown by Messrs. Veitch. It is a hybrid between *S. variolaris* and *S. psittacina*, and has curved pitchers about six inches high, richly colored with deep red, and variegated with white and green veins. Another form of *Pteris serrulata*, with crested fronds, called Densa, was shown by the market Fern grower Mr. May. It is very dense and compact in growth, and as crested as curled Parsley. The committee did not hesitate in awarding a first-class certificate to it. The same grower won a certificate for a new Bouvardia called Double Hogarth. It is precisely like the single Hogarth in color and growth, and the flowers are very double. Another was shown, but it was inferior to President Cleveland. Mr. Ware won an award for a pale straw-colored variety of the Iceland Poppy (*Papaver nudicaule*). It is called Sulphureum, which appropriately describes its color, The only new early Chrysanthemum was a shoot from the yellow Précocité with flowers of a deep bronzy-yellow. It is called Maud Pitcher, and being dwarf and compact in growth, and a free flowerer, is regarded as a good thing, and therefore was certificated. From a large number of varieties of Java Rhododendrons, from Messrs. Veitch, the committee selected for an award one called Ophelia, a lovely variety, with large flowers of perfect shape, and of a pale clear pink color. The importance of these beautiful green-house shrubs is being fully recognized now, and people have found out that they are among the most reliable plants for yielding an almost perpetual supply of the loveliest flowers one could wish, and, no doubt, their popularity will spread to American gardens. There was a large gathering of hardy ornamental trees and shrubs, but the only novelty was a golden tinted variety of the old *Taxus adpressa*. It came from the Handsworth nurseries under the name of Variegata. It is decidedly golden, and I can imagine what a big spreading tree of it will look like in future. It is a first-class novelty, and the committee, by awarding it a certificate, showed that this was their opinion of it. The new Clematis, Baron Veillard, was again shown, and though a freely-flowered specimen was shown, the committee did not seem to appreciate the color, which is a purplish-mauve, hardly bright enough for a Clematis.

London. *W. Goldring.*

Cultural Department.

Fertilizers for Ornamental Plants.

IN floriculture, the application of fertilizers may be made with three purposes in view: (1) effect on bloom; (2) effect on foliage; (3) effect on seed, bulb or other parts for propagation. The first and third purposes generally go hand in hand, and, if we secure the first, as a rule the other is attained.

Much space in the agricultural and horticultural journals is devoted to the recommendation of a plenteous application of manures to plants, but rarely do we find any testimony from experience except in the most general way. The past winter and spring I had under test in the university green-house some interesting work with manure for the purpose of ascertaining,

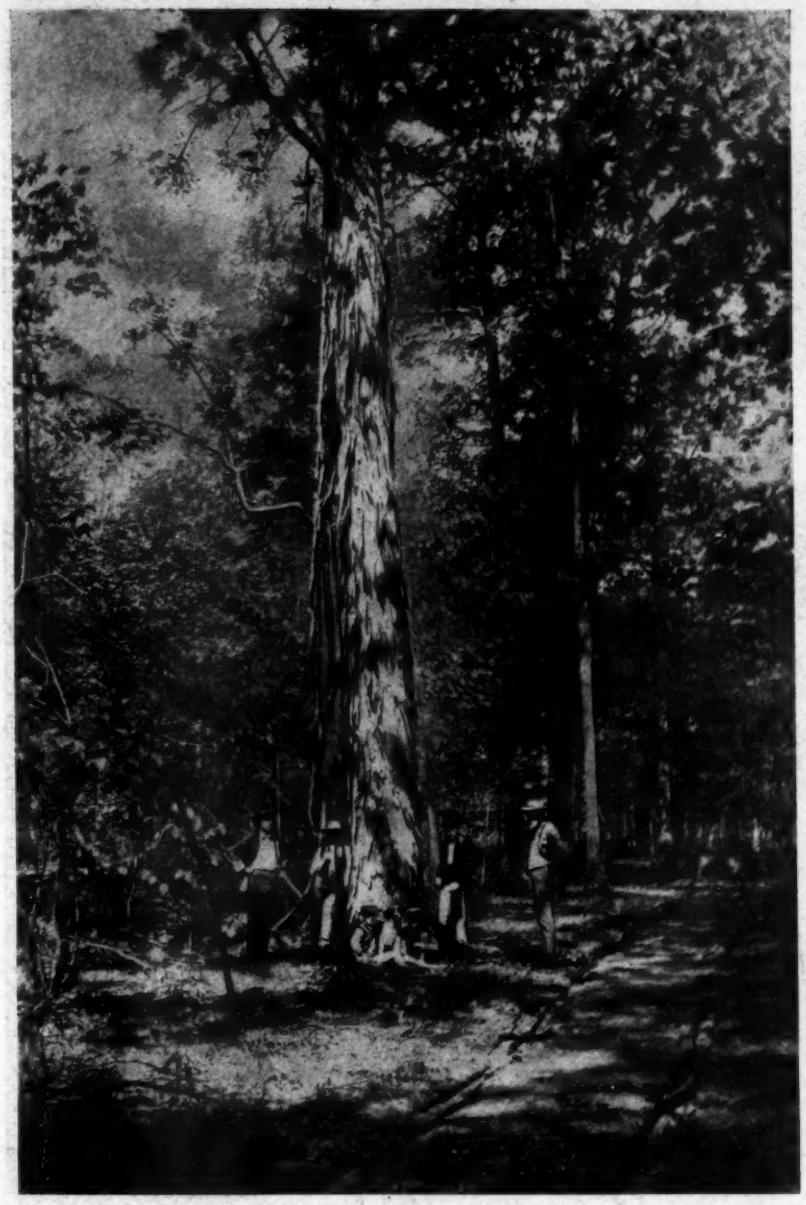

Fig. 130.—The Shell-bark Hickory.—See page 460.

in a measure, the effect of special and general manures on foliage plants and on flowers. In the first place, two lots of Coleus, one being red and the other green, received special application of mineral fertilizers. Five hundred milligrams (about 7.7 grains) of each of the following fertilizers were applied to a plant at intervals: (1) nitrate of soda; (2) sulphate of iron; (3) acid phosphate; (4) muriate of potash; (5) a complete fertilizer. The last three had been analyzed in the laboratory, and were good specimens of fertilizers; the other two were standard brands.

In beginning the experiment, six plants were selected for each manure as nearly alike as possible, excepting that three were red and three green. The plants were small, not having more than two nodes each; they had been cut back twice, and were in three-inch pots. They occupied a bench on the south side of the green-house, and had good sun exposure. Water from the same source was used in watering each set of plants. The soil the plants were grown in was as even in character as I could secure. The most striking effect from the fertilizers was seen in the application of nitrate of soda. The plants treated with this became either very dark red or green in color and assumed a robust growth of unmistakable character. The complete fertilizer had an effect almost as marked, and produced deep color and strong growth. To my surprise the sulphate of iron did not give the depth of color that other experiments would seem to have warranted us to expect in this case. The plants appeared strong and healthy, but there was nothing unusual in their color. I think that the muriate of potash ranked third in effectiveness. The acid phosphate was not effective. The color of the foliage remained light, and the plants did not make a growth equal to those treated with the soda, potash and complete fertilizer. The iron and phosphoric acid had much the same effect.

These fertilizers made themselves felt for a few weeks, when their influence appeared to wear off, and all the plants began to once more take on a similar foliaceous coloring. Again the applications were made, and once more the same effect of the different plant-foods was made manifest. Future experiments were repetitions of the first two; whenever these fertilizers were applied the same results followed.

To me, the most pertinent application of what I saw in this, was the benefit to be derived from the use of sodium nitrate in bringing out strong foliaceous coloring, and especially in plants with bright-colored leaves. If the beauty of a Coleus-bed lies in its color of leaf, its effectiveness, in my opinion, may be materially heightened by the use of proper fertilizers.

In another direction I experimented with manures on roses. I procured sixteen two-year-old La France Roses of as nearly the same size as possible. These were separated into four lots of four plants each. Before planting, the soil was carefully washed from the roots of each plant. Lot one was planted in pure, washed river-sand, and fertilized once a week with liquid cow manure. Lot two was planted in sand like one, and treated once a week with liquid horse manure. Lot three was planted like lots one and two, and fed Floralis (a preparation procured from J. M. Thorburn & Co.) once a week. Lot four was planted in our regular rose-potting soil, and fertilized weekly with liquid cow manure, such as was used with lot one. All of these plants were placed in eight-inch pots.

First and most important, the plants grown in ordinary soil thrived best and produced the greatest number of buds. At this writing they will average larger to a noticeable degree than will the others. The effect of the Floralis was injurious at first, but because too strong in application, though directions were followed; as a result one plant was killed, and the foliage removed from all. However, with reduced application, three renewed their growth and, before the season was over, yielded a fair showing of buds. In both lots where cow mauure was used, more Roses were secured than from the others. The flowers were extra fine in all cases, but I have not at my disposal, the number of blooms produced by each lot.

The reason why sand was used in three lots was to see if the effect of manure could be better shown, where the soil was comparatively clear of fertilizing matter at the start. In each case, the amount of liquid manure applied was as nearly of the same quantity and quality as I could make it. The manure used was comparatively new and free from straw. This work is still in progress, and will be further reported on, so as to be accessible to those interested.

I cannot close without referring to another fertilizer test, on a more practical basis, if you please. A portion of one of our

A Cypress Avenue at Verona.—See page 458.

green-house benches is planted with Roses. The soil consists of turfy loam well mixed with solid cow manure. Late last winter our gardener, a rather intelligent negro, informed me that he had heard that sheep manure would make the plants show their color, and begged me to secure him some. In a short time a quantity was obtained and made into a liquid and applied twice a week to the roses by Andy. Certain it is, our Roses did unusually well last spring. I shake my head in a questioning way as to the responsibility of the sheep manure for this, but Andy only laughs, and says: "Sho', P'fessor! Didn't I tell you that sheep manure 'ud do it?"

University of Tennessee, Knoxville. *C. S. Plumb.*

Fern Notes.

SPECIMEN Ferns should now be in their best condition, as in most instances the growth will be fully developed, and showing the characteristics of the perfect fronds, whether fertile or barren. And, when the fronds are fertile, it will be well to select some from which the future stock of young plants may be raised. In this selection of fronds it will be found most satisfactory to cut them as soon as the spore-cases begin to open, because when taken in this condition a fair supply of spores are usually obtained; whereas, if they are allowed to remain on the plant until the spores begin to drop, much of the best of the crop is frequently lost. But owing to the great differences in the arrangement and appearance of the spores on different species of Ferns, it requires the excercise of some judgment in gathering them to ensure success, and in this operation as in most others connected with the growth of plants, experience is the best teacher.

It seems hardly necessary to repeat that the fronds gathered for seed should be wrapped in clean paper and put in a dry place for ten days or two weeks, at the end of which period the spores may be shaken out and sown, or else stored away in small phials for future use. The month of September is a good time to sow Fern-spores for an early spring crop, for though the seedlings do not make rapid growth during the winter, they will progress far enough to be in good condition for an early start in the spring.

Good use may be made of an odd corner in the green-house by planting out a few Ferns for cutting. They may be either on the bench or underneath it, but it is preferable to grow them on the bench, as they are better under control, and the fronds are stiffer and have more substance than those grown beneath where the light is less distinct. In growing Ferns for this purpose it is best to plant them in a comparatively stiff soil, as the fronds thus grown are harder and consequently stand better after they are cut.

The following species and varieties are well adapted for this purpose: *Adiantum cuneatum*, *A. Wiegandii*, *Pteris serrulata*, *P. Cretica magnifica*, *Onychium Japonicum* and *Nephrolepis pectinata*, and all of them may be readily grown in a green-house temperature. Water should now be given quite early in the day, and the moisture kept off the foliage as much as possible by free ventilation. As much air at night as the weather will permit should be given, because when kept too close some of the foliage is sure to damp off.

Among the easiest to be injured by moisture on the foliage are the Golden and Silver Ferns (Gymnogrammas), several of which grow best under stove treatment, while some few varieties flourish in a green-house. Of those most susceptible to injury from excessive moisture on the fronds, three or four are among the finest varieties, for instance: *Gymnogramma Peruviana argyrophylla*, *G. Laucheana magnifica*, *G. Laucheana grandiceps* and *G. Wetenhalliana*, the latter being considered by many persons one of the finest of the genus, although it is not always easy to handle. While speaking of Gymnogrammas we should not neglect *G. schizophylla*, a charming basket Fern with very delicate, feathery foliage, and possessing a notable peculiarity among its relatives of this genus, its fronds being proliferous, and producing young plants on or near the apex of the mid-rib.

In the treatment of many of the stronger-growing Ferns an occasional watering with liquid manure of medium strength will be found beneficial after the plants become pot-bound, tending to keep up the rich green of the fronds, but unless the plant is quite pot-bound it is just as well without any special feeding, and if the drainage of the pot is defective it is very easy to overdo the application of stimulants in this manner. Probably the best manure to use for the above is cow-dung, it being not so likely to injure the roots, though at all times discretion should be used in its application. It is useless to give liquid manure to a weak, over-potted Fern in the hope of inducing it to break into growth, and it should be remembered that this liquid should never be given to a Fern while it is very dry, else more harm than good will result.

Those pests of the Fern-grower, slugs and snails, are usually present in considerable numbers at this season, and especially so in old green-house structures, and should be carefully hunted for at least once a day. The use of Cabbage and Lettuce leaves as traps for the slugs is about the simplest remedy, and, by a regular examination of these leaves morning and evening, many of these troublesome enemies may be destroyed.

As the time for the various horticultural shows is near at hand, some thought will be given by growers to Ferns for exhibitions, and preparations will be made for these competions. It should be remembered that the tasty arrangement of an exhibit is always a point in its favor, and to this should be added clean pots and correct and neat naming of the specimens shown, the latter being absolutely esssential to a good exhibit. In the preparation of the plants for this purpose it will be found necessary to stake up the fronds of some species; but in doing this as few stakes as possible should be used, and due consideration should be given to the natural form of the plant, so that its gracefulness may be retained. A stiff and formal arrangement of the fronds of a Fern is an abomination from an artistic standpoint, and should be utterly condemned.

W. H. Taplin.

Holmesburg, Pa.

Orchid Culture, past and present.—This subject is of such interest that I venture to offer a continuation of the notes sent last week

The profound ignorance which prevailed on the subject of Orchid culture during the early days of the present century is well illustrated by the following extract from the *Botanical Register* for 1817, under plate 220: "Air plants," for such were Vandas, Aërides and Saccolabiums then called, "possess the faculty of growing when suspended so as to be cut off from all sustenance but that derived immediately from the atmosphere. Plants of other genera of this tribe, and even of a different tribe, are endowed with a like faculty; in none, however, can such insulation be considered as the state of existence which suits them best, but merely as one they are enabled to endure, as a carp is known to do, that of being suspended out of water in a damp cellar." On reading this, one cannot help thinking of the days when birds of paradise were supposed to be altogether devoid of legs and to spend their whole lives upon the wing.

The part which the Horticultural Society of London took in obtaining information on the subject may here be mentioned. Owing to the want of success which had attended the cultivation of Orchids, a stove was set apart for their exclusive culture, but we read that "the first experiments were unsuccessful; the plants were lost as quickly as they were received." This led Lindley to inquire more closely into the conditions under which Orchids grew in their native countries, and thus to supply data for more successful cultivation. These data were chiefly obtained from the lowlands of Brazil and from India, and from them Lindley concluded that high temperature, deep shade and excessive humidity are the conditions essential to the well-being of the plants. These conclusions, published in 1830, he subsequently had reason to modify, but they appear to have been generally followed for many years afterwards.

Various travelers, who had seen the plants growing at considerable altitudes on tropical mountains, gave utterance to monitory warnings against the folly of subjecting Orchids, which naturally grew in a temperate climate, to the stifling heat of an Indian jungle, and these views were gradually adopted by a few gardeners of intelligence. Cooper, at Wentworth, adopted a lower mean temperature, and admitted fresh air into the house. Paxton, at Chatsworth, added an improved method of potting to secure sufficient drainage, and occasional watering of the paths and stages of the house, so as to secure a moist atmosphere. In 1838, Lindley wrote, "The success with which epiphytes are cultivated by Mr. Paxton is wonderful, and the climate, in which this is effected, instead of being so hot and damp that the plants can only be seen with as much peril as if one had to visit them in an Indian jungle, is as mild and delightful as that of Madeira."

One of the causes, however, which entirely revolutionized the cultivation, not only of Orchids but of all kinds of exotic plants, was the substitution of heating by hot-water pipes for the old system of hot-air flues, with its attendant evils of smoke and other noxious vapors escaping through the cracks and fissures of the flues into the atmosphere of the house. This change had been gradually effected at a still earlier period, but deserves to be mentioned as one of a combination of circumcumstances which gradually brought about a more rational treatment of Orchids generally. To us, who are familiar with the modern system of cultivation, the wonder seems that the change should have been brought about so very slowly. But the fact remains that, up to about 1860, the numerous beautiful Alpine Orchids of New Granada were killed almost as fast as they were imported by the barbarous treatment they received, and which Lindley, towards the end of 1859, confessed to be "a deplorable failure."

There yet remain a number of refractory subjects. Mr. Veitch enumerates *Cattleya citrina* and a few Lœlias and Epidendrums from the Mexican highlands, the Barkerias, some Brazilian Oncidiums, several fine Dendrobiums, the Bolleas, Pescatoreas and others, as examples of plants not yet rendered amenable to cultivation, but which gradually dwindle

away and finally perish outright. The causes of failure he attributes to our imperfect acquaintance with their native surroundings, or the difficulty of approximately imitating in our houses the climatic conditions under which they grow. Doubtless this view is the correct one, and the enormous advance made during the past quarter of a century inspires the hope that many of those which still remain refractory subjects will yet prove amenable to cultivation as the conditions under which they grow become better understood. Let us hope so.

London. *Calypso.*

Vegetables under Glass.—Market gardeners usually have a plant-house, and during the fall and the early winter it is practically empty, with the exception of the cuttings in the forcing benches and the stock plants to be kept over winter. It is possible to use this vacant space for two or three months, especially with vegetables for salads, without detriment to the plants. I have a span-roof house thirty-three feet long and twelve feet wide, heated with a smoke-flue under the benches, which are four feet wide on each side of the house, with a path down the centre. The soil used for vegetables is loam, eight inches thick, on benches; into this is dug fine horse manure. Lettuce should be set six to eight inches apart on the benches. A good variety for this purpose is the Grand Rapids Lettuce, a new kind which does well in green-house benches; Lettuce will not make perfect heads in the cool winter months, but for home use very nice plants can be raised. The house should be fumigated once a week with tobacco smoke, to kill the green aphis that would soon destroy all growth if not kept down.

Water-cress grows nicely in the bench, from slips of plants in their natural home. They should be dibbled in the benches about four inches apart each way, and, of course, watered well. A luxurient growth of tender cress can be had in about six weeks, and when this is broken off a new growth will start, and this can be repeated as long as wanted. Mint roots will grow here nicely. Chives also do well, and fresh cuttings can be put in as often as they are removed. Seeds of French Breakfast Radish, sown in rows five inches apart, will produce edible roots in about six weeks from the time of planting.

If you have no garden Dandelion growing, go to the fields and gather roots of the common variety, digging them up full length, if possible, or at least not breaking them off within six inches of the leaf. They should be placed in boxes of earth with the tops uncovered, and not too closely cut. It is better to defer the digging till the ground is ready to close up for winter, and the roots can be kept in the box till February, in a place not cold enough to allow the earth to freeze, but cold enough to prevent the plants from making any growth. They should be kept damp, but not wet. About four weeks before Dandelion greens are wanted, the roots should be set in the benches in rows, and the growth will be a matter of surprise and pleasure. They grow quickly, especially when the house is kept warm. They will yield but one cutting, and the roots must then be thrown out. Parsley roots can be set in the benches in the same way, and will give cuttings all winter.

W. Springfield, Mass. *W. H. Bull.*

Chrysanthemums.—This is a busy time with fanciers of Chrysanthemums, who must now be looking forward to the storing of plants inside at the first indication of frost, to the final training of specimen plants, and the thinning of the buds, besides the general care incident to the opening of another campaign. I have my specimen plants in quarters where they can be covered with sash in ten minutes. It may be that we shall not have frost enough to hurt the buds before the middle of October, but it is wiser to be on the safe side. The final housing of specimens will depend upon the conditions of the weather. Early-flowering kinds may be left out-of-doors a week longer than the later kinds, provided they can be protected during frosty nights. The final touches should be given to specimen plants as early as possible, for after the buds are set, and the wood begins to harden, all tying looks rough and unkempt. The thinning of flower-buds is of the greatest importance for specimen bloom. Three flowers are deemed sufficient on a single-stemmed plant, while on specimen plants three flowers should be left on each leader. Even when plants are grown in the ordinary way the flower-buds should be severely thinned. Of plants on which I am growing flowers for market I take from eight to twenty buds from each shoot, according to the variety. It is a mistake to think that thinning reduces the amount of color-effect. On the contrary, it augments it. All plants will require judicious watering when first taken in from out-of-doors. For the first two or three days it is best to be on the dry side, as, seemingly, the plants are much affected by their sudden confinement. Weak liquid manure of any kind should be given at every other time of watering.

Carnations.—It is time that Carnations for winter-flowering were housed, and the planting, whether in pots or on open benches, should be done well and firmly. Any light, friable soil seems to suit the Carnation. A thorough watering should be given as soon as the planting is complete, and then on very sunny days the plants should be slightly syringed two or three times, the last time early enough to allow the plants to get dry before dark. The watering, after the first soaking, should be done very carefully, so as not to have the bed saturated for a week at a time. It is well to remember that each day, from now until the 1st of February, evaporation grows less and less. Carnations should be staked neatly as soon as potted or benched. The ties should be neat, and they should not be very tight around the body.

Pearl River, N. Y. *John Thorpe.*

Caryopteris Mastacanthus.—In the first volume of GARDEN AND FOREST (p. 20) Max Leichtlin calls attention to this beautiful and interesting plant of the Verbena family. To the same enthusiastic botanist and collector of new and rare plants the Arnold Arboretum is indebted for a specimen of the plant which is just now, and will continue to be as long as frost does not interfere, the most attractive flowering shrub in the collection. This plant was kept in a pit last winter, so that its hardiness has not yet been tested here, but it is well worth a little trouble and care. The small lavender-blue flowers are borne in large clusters at the axils of the opposite leaves, and as the branches grow, new flower-buds continue to develop with each pair of leaves, so that the plant would bloom for a long period if not checked by frosts. It was originally found in China by Robert Fortune, but it is also a native of Japan. If introduced from its most northern habitats it may be as hardy as *Vitex incisa*, which does very well here, without artificial protection, in some favorable situations. *J. G. J.*

Correspondence.

Forests and Civilization.—VIII.

To the Editor of GARDEN AND FOREST:

Sir.—Since the publication of my report on forestry matters in Pennsylvania was begun in GARDEN AND FOREST, I have had many letters from all parts of the country inquiring whether cutting off the woods had any effect in aggravating the recent great floods in that state, or in causing the disaster at Johnstown. Some of the writers think the catastrophe should be made use of at once as a most impressive lesson regarding the consequences of forest destruction, and various things which have been written since the occurrence indicate that some vital considerations have not been adequately recognized. We have reached a stage in the discussion of forestry subjects in this country when discrimination, moderation of statement, and dependence upon actual investigation by competent observers are more and more desirable.

It is certain that the destruction of forest conditions over any considerable portion of a water-shed causes the water from rainfall or melting snows to reach the channels of the streams in a shorter time. The water runs down the slopes more rapidly, and there is, consequently, more of it at any particular point in the course of the stream at one time, and the stream is higher than it would be if the water descended more slowly to the river-bed from the hills. This is one of the most important principles of the subject of forestry, and it should be familiar to all intelligent persons. Its truth may be easily ascertained by direct observation in any mountain forest region, where considerable areas have been entirely denuded by the effects of pasturage or fire following the removal of the trees. But cutting off the forest does not, in itself, destroy forest conditions. If the ground is protected from fire and from pasturage the forest-floor is not destroyed, and the trees will soon grow again. Water will not run any faster down a hill-slope which is still covered by the sponge formed by the network of living root-fibres, decaying leaves, and the accumulation of vegetable matter usually found on the floor of a forest, merely because the trees have been cut off. Forest conditions are still maintained if the land is so proteeted that another generation of trees has a chance to grow. It is not the cutting off of the trees that causes mischief, but the breaking up of the forest-floor, and of the succession of the forest, by fire or pasturage.

During my recent examination of the mountain forests of Pennsylvania I had excellent opportunities for observing the effects of very heavy rainfall, and of comparing the rate of descent of the water over hill-side areas covered with forests,

or where forest conditions prevailed, with the rate on areas of equal slope where the forests had been removed, and the tract denuded by fire or pasturage. I went into the woods several times while it was raining heavily, and again after the rain had ceased. I had made similar careful observations here in the Adirondacks many years ago. In both regions I found that on denuded hill-side areas the water descended to the brooks and rivers much more rapidly than where the forests were still standing, or where, if they had been cut off, the forest-floor was still intact. After a heavy rain the denuded areas became dry much sooner than those of similar slope on which forest conditions had been maintained. The rate of descent of the water over hill-side areas of equal slope is in exact proportion to the smoothness and impenetrability of the surface.

As all the water-sheds of the Pennsylvania mountain forest region have been partially denuded, the floods resulting from unusually heavy rains are certainly somewhat more sudden and disastrous than they would be if forest conditions had been maintained over the whole drainage area. But there were sometimes great floods while the forests were yet unbroken, and there would be now if they covered the whole country as of old. The relation of forest destruction to recent freshets cannot be determined even approximately without much more careful and thorough observation than the matter has yet received. The entire drainage area of a stream, lake, or reservoir would have to be examined with scientific accuracy, and the proportion of forest areas and of denuded lands ascertained. Such investigations, if conducted by competent men, would probably make plain the necessity for some proportion of forest in every large water-shed or drainage area in mountain regions, and the places at which forests would be most needed for the protection of the streams and valleys could also be determined.

Until the methods of scientific investigation are thus applied to the subject, it can hardly be discussed intelligently or fruitfully, except in a very general way. Such application of scientific methods to the study of forestry subjects in this country would require a considerable advance in thought. While forestry was wholly a matter of theory for us here, it was necessarily only something to talk about, a topic for essays and addresses, and, of course, anybody could talk or write on the importance of the general subject. The method of treatment at this stage was inevitably somewhat vague and sentimental. All the illustrations were drawn from the history of the countries of the old world, and there was a natural tendency to assume that we might adopt the methods and ideas of European forestry, and put them into operation without taking the trouble to study actual facts and conditions here. This stage of library and office forestry was inevitable, but it was always plain to thoughtful Americans that it was only a stage, a degree of progress or advance, and that we should pass beyond it whenever we began to apply the methods of scientific observation to the subject in our own country.

The fact that our government is a democracy, that all the people participate in it, makes the psychological element the most important factor in this, as in all of our national problems. Everything depends upon the character, intelligence, temper, and degree of civilization of the people. Nothing greatly in advance of these can be done or established here. This is often deplored by men who wish to bring about various special reforms, yet it is not only a natural but a wholesome feature of our national condition and life. No institution which is not the product and expression of our national character can be successfully planted in our soil. If introduced from without, brought hither from alien lands, it could not be made vital or permanent. It would be artificial, parasitic, and of transient duration. The propagation of ideas, after we have the right ideas to propagate, the education of the people by the diffusion of knowledge, thus becomes the chief instrument and means for all that we have to do in this country for the advancement of our civilization, and the permanence of our national life. Many reformers are far too much disposed to rely on legislation and on government action without sufficient attention to the preparation of the public mind for the work of sustaining the laws and aiding in their efficient administration.

Real knowledge and sound practical judgment regarding forestry interests here can result only from direct, patient, and continuous observation and study of the subject, in all its aspects and relations, as a feature of the life of our own country. The labor and time required to gain such knowledge, through familiar acquaintance with the woods and streams of our country, must be paid for. Each of our principal states should have a competent officer or agent, whose work shall be out of doors, not in an office at the state capital, and who shall acquaint himself and the people with the condition of the forests and streams of the state, and with their functions and value in all their relations to the life, civilization, and welfare of its inhabitants.

Paul Smith's, N. Y. *J. B. Harrison,*
Cor. Sec. American Forestry Congress.

The Potent Pollen of the Navel Orange.

To the Editor of GARDEN AND FOREST:

SIR: The experience of Rev. Lyman Phelps, noted in No. 79 of GARDEN AND FOREST, will doubtless prove a stumbling-block to those scientists who do not believe in the direct influence of pollen upon the forthcoming fruit. That such a difference of opinion should exist among biologists indicates a *terra incognita* in the realms of botany as worthy of exploration and mapping out as the heart of Africa.

Discarding the theory of chance, there would seem to be only two ways in which so-called sports can occur—one by atavism, or reappearance of ancestral traits, and the other by the influence of foreign pollen upon the fruit, and through this upon the wood. So what we call sports are generally the freaks of pollenization.

Perhaps no family of plants is more readily affected in this way than the Citrus, and the infancy of Citrus culture in this country may account for the ignorance of many of our botanists respecting phenomena often observed by intelligent and studious Orange growers. The same phenomena are familiar to the Orange and Lemon cultivators of the Old World. A letter from one of them, published several years since in the *Florida Dispatch*, strongly condems the intermixture of all varieties of Citrus trees in one plantation as tending to produce numbers of unsaleable hybrid fruit. And this caution is given, not as an unestablished hypothesis, but as a fact well known to all. My own experience in Florida, however, would not, from a commercial standpoint, warrant such extreme caution. The venerable Col. Davey, of Orange Mills, Florida, stated that he had sometimes seen perfect lemons on Orange trees, where both had been planted together, and I have seen fruits, closely resembling an orange, produced on Lemon trees. There could be no reappearance of ancestral traits here, and these so-called sports can only be attributed to the pollen, since it is presumable that, had no Lemon trees existed near by, a lemon would never have grown upon an Orange.

No sweet oranges differ more widely than the Brazilian Navel and the Maltese Blood. Geographically and structurally they are, in a measure, the antipodes of each other. If the pollenization theory be false, then, whenever a Blood orange bears the Navel mark, it would internally and externally maintain the characteristics of its kind. Contrary to this, when Navels and Blood varieties are planted together, the Blood oranges bearing the Navel mark are often scarcely distinguishable in shape, flavor and texture from the Brazilians. How could a Maltese orange be metamorphosed into a Brazilian except through the influence of pollen? When we reflect also that there are distinct varieties of Navels, and their almost exact counterparts occasionally appear upon other trees, the evidence becomes overwhelming. So much for chance examples—deliberate experiments do but confirm what chance suggests. Rev. Mr. Phelps carefully crossed the Mandarin orange with the Navel. Mandarin oranges of the typical shape appeared with the broad seal of the Navel impressed upon the apex. When Navel trees exist in any considerable number in a grove, the peculiar mark appears freely upon other trees, and I have in mind in my own grove several young trees of a hybrid Mandarin, not a Navel, on which, this year, every fruit is stamped with the broad seal. And yet some microscopists argue a lack of energy in Navel pollen, from its often too profuse shedding of bloom, when this pollen is so marvellously prepotent as to leave indubitable traces wherever it falls.

We may go still further and note that not only is the fruit directly affected by foreign pollen, but also the wood of the same growth, in its young state, at least. Some curious hybrids, in which the traits of both parents were strongly apparent, have been created by using buds from this cross-fertilized wood. The same principle prevails, perhaps to a less extent, among other genera of plants, and variations of Roses, called sports—I think the American Banner is one—not unlikely came about in the same way. I have before me an apple, with a broad stripe of deep crimson Baldwin peel, extending from stem to apex, which grew on a McLellan tree planted among a lot of Baldwins.

Can the doubting Thomases explain how that Baldwin streak came there?

Federal Point, Fla. *E. H. Hart.*

To the Editor of Garden and Forest:

Sir.—I have read with interest Mr. Phelps' notes on the immediate influence of foreign pollen affecting the orange, and I am led to ask if he has a Washington Navel tree that from its own inherent nature or peculiar surroundings produces pollen so abundantly as to impress the fruit of surrounding trees to the extent he mentions? If so, he has a valuable tree to experiment with. The Washington Navels on Indian River are notorious for being poor bearers, and ringing, girdling and cutting has been resorted too, in vain efforts to induce greater fruitfulness. I concluded last winter from an examination of the blossoms, that the trouble was due to the fact that the blossoms were all pistillate, as I failed to find a single flower producing pollen. I also tried to fertilize hundreds of flowers by hand, using pollen from other varieties, carefully applying it to the stigma of the Navel blossoms, with complete failure, though the attempt was continued at intervals for two weeks. It is quite possible that the Navels here may produce an occasional flower with a grain of pollen which fertilizes its own pistil, but that they are able to furnish enough to visibly affect other trees is a revelation which I was unprepared for. Standing as these Navels do, surrounded by trees producing abundant pollen-bearing flowers, in bloom at the same time, and yet persistently failing to produce the least fraction of a crop, all this, together with my own unsuccessful attempts at cross-fertilization, seemed to indicate a lack of affinity on the part of these trees for the pollen of other varieties. The subject is an interesting one, and worthy of further experiment and careful, scientific study. If we could secure for the Navel the fruitfulness of other varieties it would have no rival. As for its influence on surrounding trees, I can only say that I have rarely seen an orange with the Navel mark in our Indian River groves, although Navel trees are abundant among them. *E. Williams.*

Montclair, N. J.

Notes.

Bambusa Metake has proved hardy in Mr. Hunnewell's gardens at Wellesley, Mass.

At Penny Hill Park, near Bagshot, England, is a specimen of the Japanese Umbrella Pinè (*Sciadopitys verticillata*), which is nineteen feet high, and has a circumference of branches of forty-six feet at three feet from the ground.

Mr. E. S. Carman reports that the Berckmans grape, a variety with compact clusters, resembling the Delaware in color and quality, but a little larger, has ripened perfectly on his grounds this year, while the Delaware lost its leaves early, so that the berries failed to ripen.

The members of the Forestry Commission appointed by the Governor of New Hampshire under the joint resolution of the Legislature, published in Garden and Forest a few weeks ago, are Joseph B. Walker, of Concord; J. B. Harrison, of Franklin, and George B. Chandler, of Manchester.

It is estimated that the wine product of California will not exceed 12,000,000 gallons this year. This is a reduction of 8,000,000 gallons from early estimates of this year's vintage. The reduction is due partly to damage by sunburn and mildew, but more especially to the fact that the drying of wine grapes will absorb probably 2,000,000 gallons, while 4,000,000 will go into the still. The state will probably produce 1,000,000 gallons of brandy this year.

It should not be forgotten that arsenic will kill bees as well as the curculio and the larva of the codling moth, and, therefore, Apple-trees should not be sprayed with insecticides before the blossoms fall. This is not an imaginary danger, for reports from many bee-keepers show heavy losses of bees in all stages, the imago, as well as the larva and pupa, being destroyed. This loss is not confined to the apiarist, for the bee, by aiding to distribute pollen, is a recognized help to the fruit-grower.

A correspondent of the London *Garden*, who accompanied the Scottish Aboricultural Society during their recent journey to Sherwood Forest, mentions an Oak, which, in 1724, had an arched opening cut in it, that the then Duke of Portland might be able to win a bet by driving a coach and six through "a tree on his estate." The Duke won his bet, but destroyed the Oak, which, however, every year gives proof of its vitality by sending forth a thick crop of leaves on its shored-up limbs. The tree is forty-five feet high, its girth is thirty feet at five feet from the ground, and thirty-one feet round the base.

In Kirk's recently published "Forest Flora of New Zealand" three species of Fuchsia are mentioned, although the genus is otherwise restricted to America. The most remarkable of the three is *F. excorticata*, which sometimes attains a height of forty-five feet, with a gnarled trunk up to three feet in diameter. The Central American *F. arborescens* is the only species that equals or approaches it in dimensions. *F. excorticata* has medium-sized flowers, at first of a greenish color streaked or blotched with purple, and finally of a dull red, with very small, almost black petals. The tube of the calyx is very much constricted immediately above the ovary, and there is a second constriction a little higher up. That this Fuchsia yields "one of the strongest and most durable timbers in the colony" will be news to most people. But, as the trunk is often crooked or gnarled, it is difficult to procure logs exceeding eight or nine feet in length, and its commercial value is therefore greatly diminished. Mr. Kirk says the wood is hard, dense, compact, and even, and deep brown in color, relieved by streaks of a paler shade, and short, narrow, waved, black markings. When much waved, it is of a highly ornamental character. Further, it is almost indestructible even by fire, except in a closed furnace.

The curculio has destroyed the plum crop in many places this year, notwithstanding applications of London purple in the form of spray. Carbolized plaster, applied in the proportion of one pint of crude carbolic acid to fifty pounds of plaster, has not been efficient, as it has proved in former years, to repel the insect. This failure is explained by the frequent rains, which have washed away all applications. In view of this experience, Professor A. J. Cook, in a paper read before the Society for the Promotion of Agricultural Science, comes to the conclusion that in case of very frequent rains the jarring method will not only be cheaper, but much more effective against the curculio. Again, as our wild fruits are more cleared away we must have plums in our orchards to protect the apples from the curculio. When apples are seriously stung they become so gnarled and deformed as to be worthless. It will pay, then, to set Plum-trees near by or among the Apple-trees. Then we will escape mischief among our apples, and will only need to spray our apples once, to destroy the codling moth, and can treat the Plum-trees three or four times with Paris green or carbolated lime in case we have only occasional showers, or can jar the trees when the rains are very frequent. If the carbolized plaster is preferred, it should be thrown freely over the trees, so as to strike every plum on the tree, which is being treated.

Professor J. B. Smith, entomologist of the New Jersey Experiment-station, in a recent bulletin, tells the farmers and gardeners of the state how they can help him in his investigation of insect pests. His first counsel is to be prompt, instead of waiting till the damage is done and the pests have disappeared, and he adds: "Do not waste time in describing insects. Send specimens, and send plenty of them. If an insect is really injurious, it is as easy to get a dozen as it is to get one, and it makes it a great deal easier for the entomologist. He wants two or three to put in alcohol, so that he will know them next time; the others he wants to bring to maturity, or to describe or figure so as to complete his knowledge of them. Such specimens, if dead, should be packed in some soft material, as cotton or wool, and put into a stout tin or wooden box. They go by mail for one cent per ounce. Never send insects loose in a letter! The postal clerk always smashes them flat, so that they are never of any use as specimens, and frequently not recognizable. With the specimen send also, so far as possible, a sample of the kind of injury caused by it—a bored twig or root, or gnawed stem, fruit or leaf—anything to show how the insect works. If at all possible, send the insects alive, along with a supply of their ordinary food sufficient to last during the journey. Pack them in a tight box, and do not punch air-holes into it. Insects need very little air, and the tight box keeps the food moist. Send with the insect an account of what you know of it; how it works—whether on leaves, twigs or fruit; whether above ground or underground; how long you have known it; how much damage it has done; what experiments looking to its destruction have been made, and what the result has been. Such facts are often not only of the highest scientific interest, but also of the greatest practical importance."

Catalogues Received.

Joseph Breck & Sons, 51, 52 and 53 North Market Street, Boston, Mass.; Dutch and Other Bulbs.—John R. & A. Murdoch, 508 Smithfield Street, Pittsburg, Pa.; Fruit Trees, Plants, Lilies, Holland Bulbs, etc.—W. C. Strong, Waban Nursery, Newton Highlands, Mass.; New and Choice Trees, Shrubs, Roses and Vines.